

Changes in Drug Behavior from the Middle to the Late Twenties: Initiation, Persistence, and Cessation of Use

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Abstract: Patterns of initiation, persistence, and cessation of use of licit, illicit, and prescribed drugs are presented for a longitudinal cohort from their middle to the late twenties. The cohort is representative of adolescents formerly enrolled in public secondary high schools in New York State. No additional initiation of cigarettes, alcohol, and illicit drugs occurred in the four-year follow-up interval, except for cocaine and pills. The largest proportional increase of new users occurred for prescribed psychoactive drugs. Alcohol showed

the most persistence of use, followed by cigarettes and marijuana. As the cohort ages, those who continue to use illicit drugs actively do so at lower levels of intensity than at younger ages. For each drug class, the persistence of use is strongly related to earlier intensity of involvement. By age 29, men have accumulated almost twice as many months of use of illicit drugs as women. (*Am J Public Health* 1987; 77:607-611.)

Introduction

While repeated cross-sectional surveys of the population have provided extensive data on age-related patterns of drug use, relatively little is known about the drug experiences of the same individuals over time. The most important trends to emerge from cross-sectional epidemiological surveys are the onset of experimentation with legal and illegal drugs in early adolescence, an apparent peaking in the use of illicit drugs in the years 18 to 22, and an increase in the use of medically prescribed psychoactive drugs in the middle twenties.¹⁻⁵

Monitoring the Future, a national study of a cohort of high school seniors conducted by Johnston, O'Malley, and Bachman,⁶ described patterns of use through the early twenties.⁷ In a panel study, Brunswick,^{8,9} described changes in illicit drug involvement from adolescence through the mid to late twenties among Black youths from the inner city.

An earlier report from the present program of research described the natural history of drug involvement from adolescence through age 25 in a random sample representative of adolescents, formerly enrolled in public secondary high schools in New York State, who were first reinterviewed in 1980.¹⁰ The present report presents new findings based on a further reinterview of the cohort four years later in 1984, when most respondents were 28-29 years old. To our knowledge, this is, to date, the most detailed longitudinal report on the natural history of drug involvement that charts changes in the use of a variety of drugs by a general population sample in their late twenties.

Methods

This investigation focuses on the 1984 data collection of a longitudinal sample representative of adolescents formerly enrolled in grades 10 and 11 in public secondary schools in New York State in Fall 1971. In the original two-stage random sample, students were selected from a stratified sample of 18 high schools and clustered in homerooms stratified to represent the different grades within each school.¹¹ The target population for the adult follow-up was drawn from the enrollment list of half the homerooms from grades 10 and 11, with high marijuana-using homerooms

sampled at twice the rate of the others. Students who had not participated either in the Fall 1971 or Spring 1972 waves of the initial study, and were presumably chronic absentees, were also selected for inclusion to permit unbiased estimates of the former student population in adulthood. Former nonparticipants were sampled at a lower rate (.56) than participants.

With a completion rate of 81 per cent, 1,325 members of the high school cohort (excluding 15 deceased respondents) were interviewed in 1980, at a mean age of 24.7. Four years later in 1984, 1,222 persons comprising 92.5 per cent of the 1980 participants (excluding four deceased) were reinterviewed. All told, 74.9% per cent of the initial adolescent target sample still alive was re-interviewed in 1984.

The data in 1980 and 1984 were obtained through personal household interviews based on a structured schedule and two charts designed to reconstruct on a month-by-month basis the respondents' drug use and life histories. Information was collected on the histories of use of 12 drugs: two legal (cigarettes and alcohol), four illegal (marijuana, psychedelics, cocaine, and heroin), and six drugs that should be used only under medical prescription, but that are also used on one's own (minor and major tranquilizers, sedatives, stimulants, anti-depressants, and analgesics). Colored pill charts developed for use in the general population² were used to increase the accuracy of respondents' reports. Age of onset was ascertained for all users of each drug, and detailed retrospective histories, including periods of highest use, were obtained for lifetime use in 1980, and use between 1980-84 for drugs used at least 10 times in one's lifetime.

The nonparticipants in the 1984 survey had lower educational and occupational achievement, spent more time loafing, and were more socially isolated, less attached to conventional institutions, more delinquent (among males), and generally heavier users of licit and illicit drugs. However, because of the low attrition rate between follow-ups (7.5 per cent), most of the differences between the two groups are not statistically significant; the distributions of the 1980 characteristics are identical in most cases in the total 1980 cohort and the reinterviewed 1984 sample.*

Sampling weights took into account all relevant features of the sampling design. Adjustments for the differential participation in 1980 and 1984 of the target adult follow-up sample were also included.

The validity of recalled reports of certain drug use patterns has been previously demonstrated.¹²⁻¹⁴ While there

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*Raveis VH, Haddow S, Kandel DB: The behavioral and interpersonal predictors of nonparticipation in a panel study in young adulthood. Submitted for publication.

TABLE 1—Prevalence of Drug Use in 1984 (Age 28–29) among Females and Males, and Initiation after 1980 (Age 24–25), Persistence and Cessation of Use by 1984 (Age 28–29) among Males

Drug	Proportion Who Ever Used by 1984:		(3) Initiated Use after 1980 %	Proportions of all Lifetime Male Users of each Drug who:				Males Total N
	(1) Men (N = 566) % (SE)	(2) Women (N = 606) % (SE)		(4) Had Stopped by 1980 %	(5) Stopped between 1980–83 %	(6) Used within Last Year in 1984 %	(7) Used within Last Year in 1980 %	
Cigarettes	79 .5	78 1.4	— ^a	36	5	60	64	(449)
Alcohol	99 .3	99 .3	0	4	3	93	95	(560)
Marijuana	78 1.8	70 1.7	3	35	14	52	68	(444)
Psychedelics	32 2.2	20 1.4	2	78	13	8	20	(179)
Cocaine	43 2.8	28 1.4	18	30	22	49	52	(246)
Heroin	7 .8	1 .3	8	73	8	19	11	(37)
Non-prescribed								
Minor Tranquilizers	20 1.5	18 1.4	15	59	22	19	34	(113)
Sedatives	23 1.5	16 1.4	4	71	18	11	39	(132)
Stimulants	31 2.2	20 1.4	9	65	17	18	44	(175)
Prescribed								
Minor Tranquilizers	25 1.5	36 1.9	23	53	23	24	24	(138)
Sedatives	10 .8	10 .7	10	78	14	9	37	(59)
Stimulants	5 .8	12 .3	22	67	19	15	15	(27)
Major Tranquilizers	4 .8	3 .7	41	46	18	36	18	(22)
Anti-depressants	2 .4	5 .7	54	39	8	54	—	(13)

^aLess than 1%.

is a consistent foreshortening of time in recall, gradual adjustments over the life span appeared to have occurred.¹⁰ The analyses based on retrospective reports will be affected by the biases inherent in such reports and this must be kept in mind in the interpretation of the data.

Results

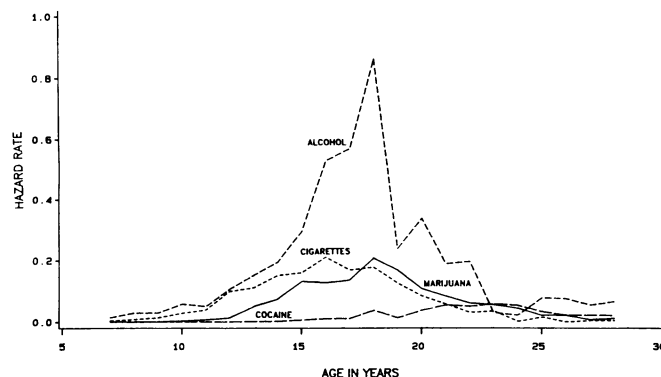
The ages 25 to 29 are characterized by greatly contrasting patterns of initiation, use, and cessation of use among different drug classes. The lifetime prevalences** of use of the major drug classes are displayed for men and women separately in Table 1, as well as the proportions of initiations and cessations of use covering a four-year span from the middle to the late twenties, among men. Patterns of change in drug behavior for women are similar to those for men, with the exceptions noted below.

Trends in Initiation of Drug Use

Four major trends are apparent regarding drug initiation, confirming patterns suggested by the earlier follow-up carried out in 1980 at age 24–25.¹⁰

- 1) There is no initiation of use of cigarettes and alcohol after age 24–25.
- 2) There is no initiation of use of illicit drugs, except for cocaine and pills. Almost one-fifth of those who had become cocaine users by 1984 initiated use after the 1980 survey.
- 3) The largest proportional increase of new users occurs for the prescribed psychoactive drugs.
- 4) There are no notable sex differences in the proportions who initiate drug use during the follow-up interval, except for more frequent initiations into cocaine for men and into prescribed minor tranquilizers and sedatives for women.

**Estimates of the standard errors for the lifetime prevalences were obtained by constructing subgroups of the original sample which are presumed to replicate the design features of the sample. The empirical variance of the estimates based on the subsamples was used as a basis for estimating the variance estimates in the total sample. These were adjusted by factors specific to each variable.

**FIGURE 1—Hazard Rates by Age for Cigarettes, Alcohol, Marijuana, and Cocaine**

Hazard functions were estimated to evaluate the major periods of risk for drug initiation and specify the proportions of persons, among those not having used the drug by a certain age, who started using it within the subsequent 12 months. Plots of the hazard functions for selected drugs covering the respondents' drug histories through age 29 are displayed for the total cohort since patterns for men and women follow similar configurations. With the exception of prescribed drugs, however, men initiate the use of drugs earlier and at higher rates than women (data not presented).

Confirming our earlier findings, initiations to cigarettes, alcohol, and marijuana increase sharply through the late teens and decline fairly rapidly subsequently, with the major risk for initiation completed by age 20 (Figure 1). By contrast, cocaine usage is initiated at a later age than either alcohol, cigarettes, or marijuana. Furthermore, it is the only illicit drug that shows continuing increases in the risk of initiation up to age 24, with a slight subsequent decline. Ninety per cent of cocaine users have initiated use between the ages of 26 and 29.

The hazard rate for the non-medically prescribed use of

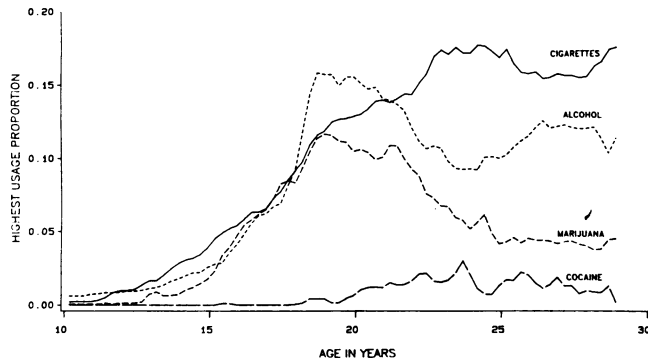


FIGURE 2—Period of Highest Use for Cigarettes, Alcohol, Marijuana, and Cocaine by Age as a Proportion of All Users

psychoactive drugs peaks at age 19, then begins to decline before stabilizing in the late twenties. Starting with lower rates of initiation than the non-medical use of psychoactive drugs, the rates for prescribed use are higher than non-prescribed use at age 21 and continue to rise through age 24, when they start to decline (data not presented).

Trends in Persistence and Cessation of Drug Use

There is considerable drug-specific variability in the persistence of use of various substances from the middle to the late twenties (columns 4–7, Table 1).

Alcohol shows by far the most persistence, followed by cigarette smoking. Among the illicit drugs, marijuana and cocaine show the highest persistence of use, psychedelics and heroin the lowest. Continuity in the use of psychotropic drugs, whether used on one's own or medically, is much lower than for any other class of drugs. For every drug, most of those who stopped using had already done so by the 1980 interview (compare columns 4 and 5, Table 1).

The net result of these changes in patterns of drug behavior is reflected in the smaller proportion overall of current users of every class of illicit drugs, except cocaine, in the late twenties relative to the proportions observed in the mid-twenties (columns 6 and 7, Table 1).

Growth, Stabilization and Decline in Drug Use

The retrospective drug histories recorded a respondent's drug usage in any month through the 1984 interview, as well as periods of highest use when a user used more than at any other time. The periods of highest usage for four drug classes are displayed in Figure 2 for those who had a highest use period.

For both alcohol and marijuana, periods of highest use decline sharply after age 20 or 21, although alcohol use rises again briefly at age 25. The contrast with cigarettes, for which highest use periods rise through age 22 and stabilize for the most part thereafter, is striking. The data suggest that there is a maturational process occurring for marijuana and alcohol usage, which is not observed for cigarettes.

The usage curve is less smooth for cocaine than for cigarettes, alcohol, or marijuana, and remains essentially at the same level throughout the twenties.

For alcohol, marijuana, and cocaine, but not cigarettes, more male than female users report periods in which they were using at higher intensities and the peaks occur earlier for female than male users, although their curves have similar shapes (data not shown).

The periods of highest use represent periods of heavy involvement, generally heavier for men than for women for

cigarettes, alcohol, and marijuana. Thus, 66 per cent of the male and 56 per cent of the female marijuana users used marijuana at least four to six times a week in their period of highest use, 41 per cent and 33 per cent, respectively, used daily; 78 per cent of the males as compared to 50 per cent of the females reported using two to three marijuana joints a day in that period. The pattern for cocaine is reversed. Although many fewer women than men use cocaine, more women than men used it daily during their period of highest use (12 per cent vs 7 per cent). Both sexes use cocaine much less intensively than the other three classes of drugs.

Trends in Degree of Involvement

For most drugs—except alcohol, cigarettes and use on one's own of stimulants—the proportions of non-experimental users (i.e., persons who used the drug a minimum of 10 times in their lifetime) decline over time, as well as their degree of involvement in these drugs. As the cohort ages, those who continue to use illicit drugs actively do so at lower levels of intensity in the late than in the early twenties. The proportions using marijuana at least four to six times a week among those who used within the last 12 months preceding the interview drop from 27 per cent at age 24–25 to 22 per cent at age 28–29 for males, and from 17 per cent to 13 per cent for females. The corresponding proportions for cocaine are 7 per cent and 2 per cent for males, 2 per cent and zero per cent for females. Prescribed minor tranquilizers are also used less intensively. By contrast, cigarettes and alcohol show little change in intensity of use over time.

Consumption Factors Related to Continuity and Cessation of Use

Two aspects of drug consumption are related to continued use in young adulthood: recency and intensity of use. The persistence of use through age 28–29 is much higher among those who were actively using the drug at age 24–25 (i.e., had used in the prior 12 months) than among those who were not actively using. This trend is especially striking for alcohol and cigarettes. Among the illicit drugs, persistence is highest for marijuana, with two-thirds of the males and 56 per cent of the females who were using actively at age 24–25 persisting in their use through age 28–29. Illustrative data for men are presented in Table 2.

Persistence of use is also strongly related to the degree of earlier drug involvement. At least twice as many of those who used marijuana or cigarettes at least four to six times a week in the year preceding the 1980 interview were active users of these drugs at the time of the 1984 follow-up compared to those who were using once a month or less. All those who were using cocaine at least four to six times a week at age 24–25 and over two-thirds of those who were using it at least twice a month but less than four times a week were still actively using the substance at age 28–29.

A comparison of the consumption histories of active and former users of illicit substances documents even more clearly the relationship between persistence of use and degree of prior involvement in a drug. A former user could be classified as a current user at a later age if use was resumed in the 12-month period preceding that age. In Table 3, the mean number of cumulative months of use by specific ages and user status is shown for marijuana among men who ever used it at least 10 times.

Active male users have used on the average from one and a half times to over twice as many months as former users; the differences are greatest in the early to mid-twenties. The length of time elapsed since former users of a particular drug last used the drug almost doubles as the cohort ages, from 27

TABLE 2—Past Year Use in 1984 (Age 28–29) by Drug Usage in 1980 (Age 24–25) among Males (N = 566)

Used in past 12 Months in 1984	Frequency of 1980 Past Year Use											
	1980 Never used		1980 Ever Used, not last 12 Months		1980 Used in last 12 Months		Once/month or less		2,3/month to 2,3/week		4/week or more	
	%	Total N	%	Total N	%	Total N	%	Total N	%	Total N	%	Total N
Cigarettes	2	(119)	16	(160)	84	(287)	38	(33)	60	(16)	91	(238)
Alcohol	—	(6)	35	(28)	96	(532)	91	(68)	96	(350)	98	(115)
Marijuana	3	(134)	18	(130)	67	(302)	40	(96)	75	(127)	86	(79)
Cocaine	7	(364)	36	(75)	54	(127)	49	(102)	66	(21)	100	(5)

TABLE 3—Cumulative Mean Months of Use of Marijuana among Current and Former Users and Time Elapsed since Former Users Last Used Marijuana at Each Age from Age 20 to 29 among Males (N = 566)

	Mean Cumulative Months of Use ^a at Specific Ages									
	20	21	22	23	24	25	26	27	28	29 ^b
Current Users:										
Used in last year	35	45	54	69	73	81	89	100	106	115
Total N	(296)	(302)	(309)	(302)	(297)	(282)	(251)	(230)	(181)	(91)
Former Users:										
Did not use in last year	16	20	27	39	46	51	60	64	68	68
Total N	(29)	(38)	(42)	(48)	(58)	(82)	(112)	(136)	(101)	(45)
Months elapsed since former users last used the drug	27	29	34	36	35	34	35	41	45	50

^aRestricted to individuals who had ever used marijuana at least 10 times in their lifetime. For former users, the mean number of months since last use are also shown.

^bNot everyone in the cohort reached the age of 29.

months at age 20 to 50 months at age 29. At any one age male users have accumulated more months of use than females and greater gaps in cumulative months of use between active and former users. By age 29, current marijuana users have used for a total of 115 months among men and 90 months among women; former users have used 68 months among men and 52 months among women.

Similar data over time and across sexes obtain for other illicit drugs, although at each age these drugs have been consumed for a smaller cumulative number of months than marijuana (data not provided). Current users of illicit drugs other than marijuana have accumulated 77 months of use among men and 44 months among women; former users have used for 51 and 23 months, respectively.

Discussion

The years from the middle to the late twenties are characterized by greatly contrasting patterns of initiation, persistence, and cessation of use for different classes of drugs. No additional initiation into cigarettes, alcohol, and marijuana has occurred except for cocaine and use on one's own of prescribed psychotropic substances. The largest proportional increase in new users, however, is observed for the medical use of psychoactive substances. The period of risk for initiation to marijuana terminates at least five years earlier on the average than initiation to cocaine.

Extending the period of observation into the twenties has confirmed the maturational trends in alcohol and marijuana use that were observed earlier in this cohort when interviewed at age 24–25.¹⁰ There is considerable drug-specific variability in the persistence of use of various substances. Alcohol shows the most persistence followed by cigarettes, marijuana, and cocaine. Continuity of use over time for prescribed psychoactive drugs is much lower. As the cohort

ages, those who continue to use illicit drugs actively do so at lower levels of intensity than at younger ages. For each drug class, persistence of use in the late twenties is greatest for those who were actively and heavily using that substance in the middle twenties. The data suggest that young adults who have not stopped using cigarettes, alcohol, and marijuana by age 24–25 are likely to continue their use at least through age 28–29. At any age, current users of a particular drug have been more chronically involved in that drug than those who stopped using it. The differences increase with age. Concurrently, the period of time elapsed since former users last used the drug also increases with age. At every age and for every substance, males have experienced longer cumulative periods of involvement than women.

The data from this study are particularly relevant to the development of prevention programs and educational efforts aimed at reducing drug abuse in the general population. The findings confirm that adolescence is the period of greatest risk for initiation to cigarettes, alcohol, and marijuana and suggest that early adolescence, prior to entry into this period of maximum risk, may be an especially important intervention period with respect to preventing the use of these drugs.

ACKNOWLEDGMENTS

This research was partially supported by grants DA01097, DA02867 and DA03196 and by Research Scientist Award DA00081 from the National Institute on Drug Abuse; and by an award from the John D. and Catherine T. MacArthur Foundation. We also acknowledge the technical facilities support provided by NIMH Clinical Research Center Grant MH30906-07. Dan Karus, Susan Haddow and Christine Schaffran provided research assistance. We are indebted to Barbara Mensch and Peter Mossel for critical comments on an earlier version of the manuscript.

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NIH Workshop to Focus on Health Benefits of Pets

A Technology Assessment Workshop on the Health Benefits of Pets will be held at the National Institutes of Health Masur Auditorium, in Bethesda, Maryland, on September 10-11, 1987.

Historically, society has recognized an important and diverse relationship between animals and humans in which various animals provide transportation, food, clothing, protection, and companionship. Within the past 10 years, significant progress has been made in defining and understanding the nature and extent of what has come to be known as the human-animal bond.

In recent years, numerous competitive research stipends have been awarded, and the scientific study of this bond has begun to mature. Research in several institutions in the United States and in Europe has likewise contributed to progress in understanding bonding.

The purpose of this workshop is to discuss scientific studies of human-animal interactions that suggest strong human health benefits for relationships with animals. The meeting will concentrate on physical and psychosocial benefits and will conclude with recommendations for future research.

To register for the conference or to obtain additional information, contact: Sharon Feldman, Prospect Associates, Suite 500, 1801 Rockville Pike, Rockville, MD 20852. Tel: (301) 468-6555.